

A comprehensive, flexible, and responsive IT workforce education and training system

V E R M O N T

Report of the Information Technology Skills Taskforce

*A study of the role of education and training in
building Vermont's information technology future*

2004 - 2006

A comprehensive, flexible, and responsive IT workforce education and training system

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Introduction • Challenge & Opportunity

Information Technology is finding its way into virtually every workplace. From retail clerks and truck drivers, to manufacturing engineers and nurses. From large corporations to sole proprietor businesses, the ability to locate, organize, and share information are quickly becoming essential workplace skills. The success of Vermont businesses, schools, colleges, hospitals, government, and non-profit organizations increasingly requires that people have the skills to use technology efficiently and effectively.

At the same time that this technology is entering the workplace, Vermont's economy is undergoing a dramatic shift driven by a number of external factors. As a result, we have experienced a ten year high in the unemployment rate, the loss of thousands of manufacturing jobs, the decline of the agricultural and forestry industries, and other changes that have resulted in substantial job losses. The continued erosion of employment sectors that have traditionally provided some of the State's best jobs¹ has hit many rural communities very hard. Moreover, according to Erica Groshen of the Federal Reserve Bank of New York, most of those workers will not be recalled. She points out that unlike past recessions the current lay-offs reflect permanent restructuring of the economy. As a result, many laid-off workers cannot expect to be recalled, and most will need to be retrained to find new jobs.

The emerging "information economy" presents us with an unprecedented opportunity to address the needs of these unemployed and underemployed workers, and to strengthen our traditional employment sectors. The Department of Employment and Training projects that between 2003 and 2008 Vermont will need to replace a total of 39,000 workers and find an additional 17,000 qualified people to fill new jobs. Many of those

will require significant postsecondary education and training. Further, DET projects that 7 of the 12 fastest growing jobs, totaling over 800 new positions over the next five years, will be IT jobs, and that the majority of new jobs created outside the IT sector will also require significant Information Technology skills. These statistics are evidence of technology's dramatic impact on the workplace, a phenomenon that presents an opportunity to strengthen all sectors of the Vermont economy.

For example, in the manufacturing sector, the effective use of Information Technology has been demonstrated to produce productivity gains, increase production flexibility, and reduce product development cycle-time. In the agriculture and forestry sectors, Information Technology can increase yields, reduce costs and offer unprecedented access to national and international markets for even the smallest rural enterprise.

Jobs requiring IT skills present a particularly good growth opportunity for Vermont because they overcome our traditional handicaps of remote location, high energy costs, and inclement weather. These jobs are also consistent with our goals of a healthy environment, good wages, and a high quality of life. In planning to take advantage of this opportunity, the State's schools, colleges, State government, and proprietary training institutions have a central role to play. In addition to employing a significant number of Vermonters in high quality jobs that require a high level of Information Technology skills, these institutions also provide a solid foundation on which to build the State's knowledge economy. Providing these institutions with the resources necessary to support the growth of IT jobs is an essential economic development strategy.

The skilled workers that our educational institutions can provide will not only contribute to the growth of Information Technology firms, but to the competitiveness, productivity, and growth of all sectors of the

Skilled IT workers will create exciting new enterprises and new ways of doing business that are driven by the ingenuity and creativity for which Vermonters are known.

¹ DET Occupational Information Center

² DET Occupational Information Center

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economy. In addition, skilled IT workers will create exciting new enterprises and new ways of doing business that are driven by the ingenuity and creativity for which Vermonters are known (*see Part III for several*

profiles of Vermont businesses that have used IT as a primary business strategy). It is with these ideas in mind that the HRIC convened a group of educators and business leaders to explore strategies that would position Vermont to take full advantage of the emerging IT economy.

What are Information Technology Jobs?

The Information Technology Association of America (ITAA) defines IT jobs as Researchers, Programmers, Database Administrators, Web Administrators, Network Systems Specialists, and Technical Writers. These are the “IT Producer” jobs which have IT products as their primary focus. These tend to be higher level specialized positions in firms involved in production or advanced application of these products. Vermont has an impressive array of firms that employ these high-level IT workers.

However, because Information Technology is becoming so pervasive, there is an even greater number of “IT User” or “Knowledge Worker” jobs that are found in almost all workplaces. The Bennington County School and Workforce Partnership (Bennington WIB) has published a comprehensive survey of jobs in Bennington County that will require IT skills. The survey revealed that while high level “IT Producer” jobs are present in Bennington County, there is a much greater number of entry and mid-level “IT User” jobs, identified as levels 1 through 3 on the adjacent chart. These jobs pay above average wages and are found in a wide range of employment settings. Although the number of job openings in Levels 4 through 7 are fewer, the salaries are well above average, and the availability of workers with these skills is essential to the success of many businesses. Clearly, State education and training policy should address all of these levels of IT employment.

The North East Kingdom WIB also studied IT jobs and published the Survey of the Use of Information Technology in the NEK, prepared by Duey Associates. They reported that “the majority of users in this survey

would not be considered computer professionals. However, some level of IT skills are now required by between 40% and 60% of the regional workforce.” In some industries the rate was much higher, totaling 100% in the IT service sector, 95% in the financial sector, and 83% in the media/graphics sector. At higher levels of IT use, 10 businesses in the NEK reported using one or more mainframe computers, and 68% of businesses reported using Local Area Networks (LANs), both of which require technicians at skill levels 5/6 or higher. These jobs often require the ability to develop or adapt software, design and install networks, maintain hardware, and manage security. While the number of these higher level workers required is small, employers in the North East Kingdom reported

that they expect their needs for workers at these levels to double over the next five years, and 20% of employers reported that these workers were difficult to find.

This data has significant implications for our educational institutions. IT skills, at least through Level 2 on the accompanying chart, must now join academics and soft skills as essential competencies. The significance of this change in educational expectations was recently recognized by the Vermont State Board of Education which has adopted new “Career Cluster” curriculum standards that imbed IT as a foundation skill in every secondary career preparation program.

The Bennington and North East Kingdom studies both revealed a great variety of IT jobs that provide excellent employment opportunities. These two WIB studies revealed that; 1) many of these jobs require training that is not readily available, 2) the IT skill requirements for these jobs are higher than has been recognized, and are accelerating 3) these jobs exist not only in the traditional population centers but also in rural areas of the State, 4) these jobs often pay wages that are well above State and local averages.

Level 1	Requires rudimentary computer skills: filling out online forms, moving between forms and files, retrieving and saving information, elementary word processing.
Level 2	Requires good working knowledge of standard office software to manipulate and format information: word processing, spreadsheets, simple databases, presentation software
Level 3	Requires facility with industry specific software to produce original materials: digital media, web pages, graphics design, AutoCAD, specialized financial management software
Level 4	Requires ability to use a programming language for application or systems programming
Level 5/6	Requires knowledge of hardware and maintenance, and the ability to troubleshoot and provide technical and network support
Level 7	Requires advanced knowledge of programming and application or system architecture

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The facts revealed in these studies helped the HRIC gain the attention of the National Science Foundation, resulting in a significant multi-year grant to Vermont that will support the redesign of IT programs at the Vermont State Colleges in partnership with the Vermont Department of Education. The HRIC believes that in addition to improving the effectiveness of State training funds, a well constructed IT workforce development policy will attract additional investments in our educational institutions by foundations and federal agencies.

The Potential Impact on Workers and the Economy:

There are projected to be at least 725 high level ITAA “Producer” jobs open in Vermont each year through 2005 as a result of new and replacement job openings². “IT User” jobs are expected to show even greater growth. For example, there are projected to be an average of 175 new jobs that require IT skills and hundreds more replacement job openings each year in Bennington County alone. In addition, employers of all sizes will need to upgrade the skills of their employees on a continuing basis as technology evolves.

According to the Bennington Study, even entry level positions that are found in the Financial Services sector (Level 1), have a pay range beginning at \$19,000 and progressing up to \$31,000 a year. In the IT and Publishing sectors the greatest number of positions are found in Levels 2 and 3 with salary ranges of \$25,000 to \$60,000 a year. Typical wages for workers with IT skills listed by DET include; Computer Operators \$25,510, Desktop Publishers \$28,270, Medical Secretaries \$24,930, Word Processors and Typists \$24,170, Job Printers \$31,730, and Graphic Designers \$33,380. In addition, 30 of the 33 employers surveyed in Bennington County offered benefit packages including health care. Statewide data shows that nine out of ten of the high growth occupations that require Bachelor’s degrees are in information technology.³ Furthermore, computer related average annual wages are a *minimum* of 25% higher than the average Vermont annual wage of \$28,920.⁴

Together the IT Professional jobs and the broader range of IT jobs identified by the Bennington and NEK WIBs represent an unprecedented opportunity for Vermont workers.

In many cases, an individual can master the skills necessary to qualify for these jobs by attending part-time postsecondary or adult education programs for a year or less. As encouraging as these projections appear, they measure only the anticipated needs of existing businesses for employees and do not address the tremendous potential of IT driven innovation and entrepreneurship to create new enterprises and new jobs.

In addition, IT jobs present particularly good opportunities for individuals who have traditionally had difficulty accessing good jobs. Current statistics show that women in Vermont hold jobs that on average pay 25% below those held by men. Preparing more women for jobs requiring IT skills offers an opportunity to reduce this earnings gap. Yet, increasing the participation of women in this field has proven to be difficult. For example, in spite of focused recruitment efforts, only one in eight students enrolled in secondary IT programs at the Regional Technical Centers is a woman. (*see Part IV for information on the challenges and opportunities for women in the IT field*).

Beyond offering good pay and working conditions, IT also presents the opportunity to redefine what constitutes a workplace, opening employment opportunities for many more workers. The potential for individuals to use IT to work at home, either as an employee or for themselves is only beginning to be understood. Putnam Investments, a national investment firm, and the Citizen and Immigration Service (formerly INS) already have hundreds of employees working from their homes in Vermont. Working at home saves the time and cost of commuting, and provides new opportunities for elderly workers, parents with young children, those who are caretakers, and people with disabilities. Home workers also represent a significant new source of workers at a time when labor force growth in Vermont is at its lowest level in several decades. This labor shortage is the result of the baby boom generation beginning to retire at a time when the traditional sources of new workers; youth, women, and immigrants are growing more slowly than in the past. The opportunity to tap these sources of labor will become increasingly important as the economy recovers. The Vermont Telecom Advancement Center researched the skill sets necessary for such jobs (*See Part IV for a summary of the VTAC findings*)

² DET Occupational Information Center – Computer and Mathematical Job Family

³ U.S. Department of Labor Bureau of Labor Statistics | Bulletin 2540

⁴ The Digital Economy Fact Book, Second Edition 2000

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How Vermont Can Respond:

The HRIC IT Skills Taskforce asserts that growing Vermont's IT economy is essential for the future economic health of the State, and is convinced that this is an economic sector where Vermont can compete successfully on a national level. Doing so will require that we develop a comprehensive, flexible, and responsive education and training system that can support workers and employers by providing access to multiple levels of education and training in all corners of the State.

Many of the key components of this system are in place. However, full coordination across the public school system, workplace training, private training providers, and higher education remains a challenge. Ideally, individuals should have the opportunity to advance their education over time utilizing the services of multiple providers, including training offered within the workplace, without gaps or duplications, and with full transferability of credits and credentials earned, wherever they might live in the State. Such a seamless system would be an invaluable resource to individuals and the organizations that employ them.

A focus on strengthening IT education and training services at all levels K-16 and beyond, including research capacity at the University of Vermont, can also significantly enhance the organizational effectiveness of businesses, schools, training programs and colleges. In Vermont, education is a highly developed sector which currently employs 34,830 workers, representing 11.6% of the State's workforce. Improving the IT infrastructure of schools and colleges will increase the effectiveness of instruction, make IT a part of every student's daily experience, and position Vermont with a workforce that can compete with the best in the world.

Employer Needs:

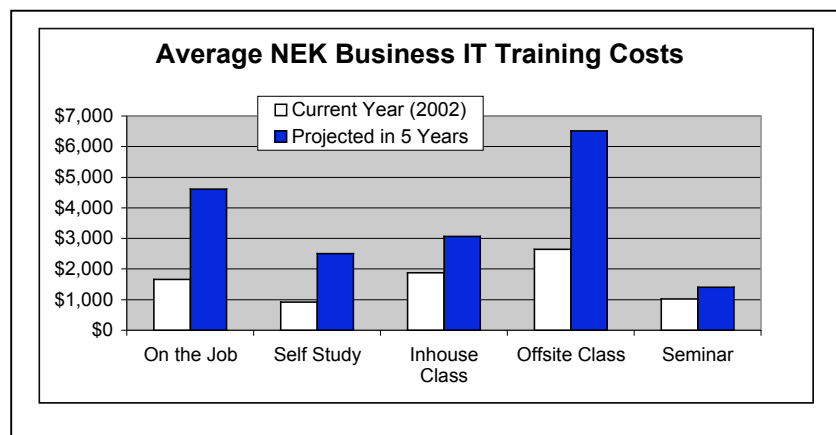
As technology continues its rapid evolution, the education sector and the business sectors must become more closely linked. IT workers and the organizations that employ them are highly dependent on the availability of quality education services. Competing in the emerging economy will require that IT education and training become an integral part of every organization's business plan (*See Part III of this Report for profiles of several Vermont businesses that have successfully made this transition*). An

excellent example of this trend is provided in the North East Kingdom IT skills survey in which businesses indicated that they anticipate very significant increases in spending for IT training for both in-house and purchased training services.

Large firms may find it practical to develop their own internal capacity, perhaps with some consulting or support from outside professionals or postsecondary institutions. Smaller employers may find it

more cost-effective to join with others to form a training consortium or establish a long term working partnership with a private training organization, technical school or college. Very small firms and the self-employed may find it most effective to enroll in locally offered classroom or on-line programs as needed. Professional credentials such as those offered by MicroSoft, CISCO, and Novell, as well as college certificates and degrees, will become increasingly important as workers seek to document their accomplishments and employers seek ways to identify qualified employees.

Under all these scenarios, employer needs will best be met when our educational programs are attuned to the rapidly evolving needs of the workplace, coordinated across multiple institutions, and available 24/7 anywhere in the State. The Taskforce also believes that



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consideration should be given to the training cost barrier for small businesses and workers who cannot afford the necessary training. Programs such as VSAC Loans and Grants, the Vermont Technology Extension program, Welfare to Work programs, DET's Workforce Investment Act programs, the Workforce Education and Training Fund, the Vermont Training Program, Registered Apprenticeship programs, the Small Business Development Center, the Vermont Manufacturing Extension Center and others have an essential role to play in ensuring that all Vermonters and all Vermont businesses have access to IT skills training.

The Education and Training Challenge:

The demand for these services presents educational institutions with a genuine opportunity and a significant challenge. The raw material of the IT industry is the product of the education sector - knowledge. The more value the education sector can add to the IT workforce, the more successful workers and employers will be, and the more high quality jobs will be created. Demand for IT workers, particularly at the higher and more specialized levels, has softened in the current recession, and we have seen some IT jobs exported. However, employers in Bennington and the NEK reported an under-supply of IT workers, a finding that we believe represents a Statewide need. These employers also reported that they have been forced to recruit out of State, or do without, and that local education and training opportunities were often unavailable, cost prohibitive, or not sufficiently targeted to their needs. When the economy emerges from the recession, we can expect demand for workers with IT skills to be very strong.

According to the New York Times, in an article on the outsourcing of IT jobs published on February 15, 2004, both Intel and IBM have seen a net increase in US IT employment over the past two years, adding more IT jobs in the US than have been lost to outsourcing, and "After two years of slight decline, the number of professional software developers rose in the US last year to 2.35 million...more than four times the number in India and seven times the number in China." The article points to the necessity for IT workers not only to master the technology, but also to have the ability to apply the technology to everyday problems in the workplace, something that cannot be accomplished by workers thousands of miles away. Brendan

Barber, the British labor leader, was quoted in the Times article as stating "The best way to protect workers is to retrain them and give them new skills so they can compete. You can't close down the global economy." If Vermont is to benefit from these changes we should begin immediately to invest in a comprehensive, flexible and responsive IT education and training system. Workers who are unable to adapt and master technology will have difficulty making career progress and may even find their employment status to be at-risk. Employers who see growth opportunities, but are unable to find qualified workers, will outsource their work, relocate to places where these workers can be found or simply find themselves unable to compete. Therefore, the full range of IT education and training from the basics through industry recognized credentials, postsecondary programs, advanced degrees and research opportunities must be addressed in Vermont's IT job development policy.

These demands will create new opportunities for education and training providers to evolve innovative ways to deliver their services.

Conclusion:

The expected growth in IT Industry jobs, along with the increasing IT skill requirements in most other jobs, is having an unprecedented impact on workers and employers. Vermont's transition from an agricultural economy to an industrial economy took over 50 years. The transition to an information based economy may take only a decade, and this transition is placing a far greater demand on our education and training infrastructure than ever before.

For many Vermonters, the acquisition of IT skills will be the determining factor in their ability to get and keep a good job. For companies, the ability to successfully incorporate Information Technology into their work processes will be the determining factor in their survival. For the State's economy, the ability to respond to these challenges and seize the opportunity that they represent will largely determine our future economic prosperity.

PART I

A Vision, Mission, and Goals for Vermont's IT Future

Vision:

Vermont will lead the region in the creation of new jobs that utilize skilled IT workers, and will have a system of Information Technology education, training, and research that is comprehensive, seamless, flexible, and responsive.

Mission:

The Vermont IT Skills Taskforce will provide a link between education and training providers, research institutions, and employers by identifying IT skill gaps, and supporting the development of and access to essential education, training, and research opportunities.

Goals:

- 1) Schools and educational institutions, both public and private, will have the facilities, staff expertise, and resources necessary to meet the IT education/training/research needs of Vermont's growing IT economy.
- 2) Education and training providers will continuously monitor and respond to the immediate needs and future skill demands in the IT workplace.
- 3) Individuals will be well informed about employment opportunities that require IT skills and will have lifelong access to the necessary education and training services.
- 4) Government entities will utilize IT to maximize worker productivity and to improve customer service, and will support and encourage broadband access and the development of IT skills across the State.

PART II – Action Plan

Goal 1 - Schools and educational institutions, both public and private, will have the focus, facilities, staff expertise, broadband access and resources necessary to meet the IT education/training/research needs of Vermont's growing IT economy.

Students will have access to IT hardware, software and high-quality instruction that supports high skills for individuals and meets the evolving needs of employers. These services will be available in a traditional school or college settings, in the home for on-line programming, and in the workplace.

Activities:

- 1.1 Create a competitive IT program development fund to support the cost of equipping and upgrading public institutions.
- 1.2 Create a training grant incentive program to match and expand employer investments in IT training for their workers.
- 1.3 Utilize the capacity of UVM to; attract research grants, build business/education partnerships, support technology transfer.
- 1.4 Establish a collaborative IT instructor professional development program that serves the staff of multiple institutions.
- 1.5 Create an IT specialist in every school to develop curriculum, attract students, and to assist and support teachers.
- 1.6 Develop part-time after school classes and school computer clubs supported by roving IT specialists.
- 1.7 Expand availability of on-line IT instruction, basic through advanced.
- 1.8 Build the infrastructure to ensure that all citizens, schools, and employers have broadband access.
- 1.9 Develop statewide plan to transfer outdated school, college, or business computers to individuals in need.

Contributing Organizations:

HRIC
HRIC / VSC
UVM
VSC, DOE, Pvt. Institutions
DOE, Local Schools
DOE, Local Schools
All IT training providers
Vt. Broadband Council
Recycle North

Indicators: (Measurement of these indicators will occur in the second phase of this project)

- 1.a. Total number of IT course enrollments*.
- 1.b. The number of IT instructors participating and receiving licenses or other professional credentials.
- 1.c. Research grants received at UVM.
- 1.d. The percentage of public secondary schools that require IT competency as a graduation requirement.

• disaggregated by gender, age, disability, race, geography, etc

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Goal 2 - Education and training providers will continuously monitor and respond to the immediate needs and future skill demands in the IT workplace.

Education and training investments will be used as a tool to grow Vermont's economy. When fully implemented; IT education and training programs will evolve on a continuous basis to meet emerging needs, individuals will be assured that their investment in education and training will open new opportunities, and employers will view the workforce preparation system as a competitive advantage and a strategic asset.

Activities:

- 2.1** Use WIBs to gather information on employer IT skills needs, and develop programs that respond to those needs.
- 2.2** Develop an inter-agency collaborative of skilled assessors to provide cost-effective IT needs assessments to employers.
- 2.3** Utilize labor market data to project skill demands, identify “digital divide” concerns, and inform program planners.
- 2.4** Expand the availability of IT professional certificates and credentials that are valued by employers.
- 2.5** Develop a mechanism to provide interaction and discussion among IT professionals about IT ventures in Vt.
- 2.6** Develop a small-business-specific IT training and technical support program.
- 2.7** Integrate IT into all secondary classes - require IT skills for educator licenses.
- 2.8** Incorporate the availability of skilled IT workers and a responsive IT training system into business recruitment efforts.
- 2.9** Identify and prioritize training for IT occupations, such as system security, and others that are unlikely to be exported.

Contributing Organizations:

HRIC & IT Education Providers
WET Consortium
DET
All IT training providers
VMEC, SBDC
VMEC, SBDC, VSC/VTE
Dept. of Education
Dept. of Economic Development
Dept. of Economic Development

Indicators: (Measurement of these indicators will occur in the second phase of this project)

- 2.a** Increase in the number of jobs requiring IT skills
- 2.b** Increase in the number of IT workers from currently unrepresented groups; women, people with disabilities, and minorities

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Goal 3 - Individuals will be well informed about employment opportunities that require IT skills and will have lifelong access to the necessary education and training services.

The IT education and training system will be seamless and fully integrated in order to maximize its benefits for the individual user. When fully implemented, individuals will have accurate and timely information about IT jobs and be able to conveniently access the services of multiple education providers to satisfy their career needs.

Activities:

- 3.1** Develop a fast, free, on-line “IT Literacy” assessment instrument to help students determine where to start.
- 3.2** Create a marketing program about IT jobs for guidance departments, parents, adults, youth.
- 3.3** Market the essential nature of IT skills in all jobs and careers through Career Resource Centers and school/college counselors.
- 3.4** Target women, minorities and individuals with disabilities with information, and support them in IT programs.
- 3.5** Establish a clearing house to inventory, coordinate and support all programs targeted to women/girls in IT.
- 3.6** Build seamless secondary/postsecondary programs, course equivalencies, and career academies that link all IT programs.
- 3.7** Create flexible degree models to maximize student choice and to support rapid course redesign/innovation.
- 3.8** Integrate IT into all high school courses across the curriculum and require IT skills for educator licenses.
- 3.9** Develop a wide variety of opportunities for students to apply IT skills in real world contexts - workplaces and community.

Contributing Organizations:

HRIC/DOE/VSC
VSC, DOE, Learn to Earn
DET, DOE, VSC, UVM, VSAC
All IT providers and IBM
Vermont Institutes
All IT providers
VSC/DOE - NSF Grant
DOE
DOE, High Schools, VSC

Indicators: (Measurement of these indicators will occur in the second phase of this project)

- 3. a** Number of individuals of enrolled in IT education and training courses.*
- 3. b** Number of industry recognized credentials earned.*
- 3. c** Number of secondary IT program completers and postsecondary IT degrees earned.*
- 3.d** Increase in individual worker wages
 - disaggregated by gender, age, disability, race, geography, etc

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Goal 4 - Government entities will utilize IT to maximize worker productivity and to improve customer service, and will support and encourage broadband access and the development of IT skills across the State.

When fully implemented, State government will be a leader in the use of IT. State Government will utilize IT to improve the performance of State programs and the delivery of State services, and develop strategies to accelerate the deployment of broadband service.

Activities:

- 4.1** Increase usage of on-line government services by 10% a year and benchmark against other states.
- 4.2** Initiate a pilot project in State Govt. to evaluate worker IT skills, and if indicated, plan to expand training opportunities.
- 4.3** Utilize the purchasing power of State agencies, schools, and higher ed to accelerate broad band access across the State.
- 4.4** Utilize the purchasing power of public institutions as a tool for local demand aggregation.

Contributing Organizations:

Dept. of Info. & Innovation (DII)
Dept. of Human Resources (DHR)
Dept. of Info. & Innov. & PSB
Vermont Council for Rural Development

Indicators: (Measurement of these indicators will occur in the second phase of this project)

- 4. a** Number and percent of customers utilizing on-line government services
- 4. b** Number of State employees assessed for IT skills*
- 4. c** Rate of broadband implementation across the State
 - disaggregated by gender, age, disability, race, etc

Part III Business IT Success Stories

Al's Snowmobile

Newport, Vermont

Although Al's snowmobile (www.AlsSnowMo.com) has been selling snowmobile parts to northern Vermonters since 1964, the past decade has transformed this local Vermont business into the largest used snowmobile parts distributor in the world. In 1995, the business outgrew its 5 bay garage and built its first 25,000 sq. ft warehouse. Today its 85,000 item local parts inventory sprawls into 45,000 square feet over two buildings in Newport, Vermont and includes millions more products through connectivity with 37 vendor warehouses through the use of an IT supplier network strategy.

How did this local Vermont company owned by Al Briere become such a big player in this \$6 billion a year snowmobile parts industry? Much of it was through the vision of Patrick Martell about how IT could help the business. Patrick remembers the days when he would try to locate snowmobile parts by accessing the database inside Al's head. "I knew there had to be a less painful way for me to do my job" says Martell as he encouraged the company to consider database technology. The implementation of this database technology became key to the company's growth and evolved from a Clipper database, to Microsoft Access, to Microsoft SQL on a .Net platform. **The company has become a large enough player to drive the IT departments of its vendors to invest in database technology that makes their inventory available in real time.** "When a customer calls me," Martell explains, "I can access the New York warehouse of one of my 37 vendors and confirm that I have what is needed in stock. When you spend a half million dollars a year on new after-market parts, your vendors are very open to listening to your needs and making an IT investment that will help the two of you become better business partners."

Martell feels that training supports his business by helping IT personnel communicate and make decisions that bring value to the company. "Often IT

folks don't understand the business world and the business decision makers don't understand the IT value of a decision. If business owners are going to spend money on IT staff and training, they have to understand the true business value."

Al's employee staffing has grown from five employees in 1990, to a 35 employee staff (3 of which support IT locally). In addition, their IT support needs lead to a partnership with a Middlebury based company that dedicates eight IT professionals to support the growing IT demands at Al's Snowmobile. Although it is important for some employees to have very specific IT training, it is key that most employees who use computers have mastery of core technologies such as Microsoft Excel, Word, etc. Martell feels he needs a broad based understanding of IT and reads about changes in the IT world and looks for IT trends that might bring about a positive return on investment for the company. "I leave the IT specialized knowledge such as C+ or .Net to IT trained professionals, but I keep current enough to drive the vision and concepts that keep the company moving forward. Our goal is to continue to grow so that we rank amongst the biggest new and used snowmobile parts distributors in the world. None of this will be possible without a continued investment in our people and equipment to support our vision."

Green Mountain Power Corporation

Colchester, Vermont

Technology at Work: "We started out embracing technology to survive. Now it is part of our culture." – Dee Johnson, Human Resource Manager

Green Mountain Power Corporation, headquartered in Colchester, Vermont, sells electricity and associated services to one third of the retail electricity customers in Vermont, encompassing seven counties. Green

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Mountain Power also sells operational services to other Vermont utilities as well as wholesale electric power throughout New England. The company was formed over 100 years ago. Green Mountain Power common stock is traded on the New York Stock Exchange (NYSE: GMP).

A firm commitment to innovative technology is at the heart of Green Mountain Power's operating vision. President and Chief Executive Officer Christopher L. Dutton explains, however, that the vision is not filtered through rose-colored glasses: "Technology—wisely used—is a tool, not a master. Technology can help us succeed only if we have a laser focus on our fundamental business—running a distribution company that serves customers extremely well. **Our drive to increase customer satisfaction and improve performance has forced us to look at how we use our technology in a more creative, cost effective and aggressive way.**" Green Mountain Power deployed new information technology on three fronts: working with retail customers, working with customer service software, and managing the work of field crews. Prominent in these initiatives were 1.) new online capabilities allowing Green Mountain Power customers to access information about their accounts, their electric use, and the utility itself; 2.) deployment of customized Banner software for customer service and interdepartmental data sharing and 3.) the installation of laptop computers in all line trucks with the ability to access Global Information Systems maps as well as the Green Mountain Power service database.

Business Situation: The installation of laptop computers and GIS access meant line workers could find their call destinations and communicate with headquarters far more easily than when they relied on cell phones, pagers, and manual paper documentation. These laptops provide line workers access to accurate maps, actual pictures of poles and transformers and spreadsheets of technical information about every piece of equipment in the GMP system.

Gaining this technology allowed the line workers direct access to all systems and their status. Green Mountain Power line trucks also have satellite transmitters installed to provide real time information about where

the truck is located. Their schedulers can refer to an electronic map of the GMP service area that indicates where the outages and crews are. This yields efficiency in the area of dispatching resources to the areas most in need of service at all times. In order for the technology to be used effectively, the line workers needed to be trained in process and workflow as well as how to use the laptops. It's one thing to have the tools, but being able to use them efficiently is crucial to the success of the overall deployment of this technology.

Solution: KnowledgeWave Training provided a series of training classes for the line workers. The training began with Microsoft Windows navigation and file management, which helped dispel any intimidation they felt in starting the use of the new laptops. Once they were comfortable with the basics, the provider conducted a series of Outlook and Word training classes. This training at Green Mountain Power complements the many other application classes the provider delivers to Green Mountain Power employees. Green Mountain Power staff finds continuity in the style of training they receive; learning time is expedited because it occurs onsite and is always relevant to on-the-job use.

Benefits: The overriding benefit of KnowledgeWave's work with Green Mountain Power has been to effectively provide the most appropriate application of information and skills. Line workers are much more proactive with their laptop usage. The training gave them the confidence needed to learn and use the new systems. As a result, Green Mountain Power can maximize its use of technology as a whole. Outcomes that prove the effectiveness of the technology and its use include:

- Information efficiently flows through a data circuit linking customers, call center, dispatch, engineering, and line crews.
- Paper work is reduced and documentation is streamlined.
- Line workers' instant access to maps, photos of poles and transformers, customer information and technical spreadsheets have reduced response time during outages and service events.

A comprehensive, flexible, and responsive IT workforce education and training system

- Line workers can respond faster and are thoroughly prepared to address emergencies.
- Training yielded more effective lines of communication between employees company-wide.
- The number and duration of outages is reduced.

Trough the use of technology, Green Mountain Power has remained one of the most efficient electric utilities in the country. The 2002 Annual Report states, "In 2002, we served 461 customers per employee, about 40 percent more than the national average of 337, according to the most recent data available."

IDX Systems Corporation

South Burlington, Vermont

Fast track training for retraining dislocated workers: - IDX Systems Corporation is the third largest healthcare software-development company in the country. IDX, with its headquarters in South Burlington, employs over 2,000 people in seven offices around the country and now has an office in England. The company has struggled over the years to find skilled IT workers in the healthcare field – and at times found it necessary to build its workforce from outside of the state of Vermont.

In 2002, IDX combined its need to bring in new skilled workers (in this case, software engineers and software analysts) - with its interest in providing under-employed and displaced Vermont workers with the opportunity to fill these positions. The problem - a shortage of available applicants with directly applicable backgrounds - was turned into an opportunity for talented individuals to work at IDX. The Vermont Information Technology Apprenticeship Readiness Program (Vermont ITAR) was formed as an initiative of Vermont HITEC, Inc., a local nonprofit organization.

Vemont ITAR is an eight-week education and training program, followed by a one-year apprenticeship with a designated business – in this case, IDX. Funding for Vermont ITAR was provided by

the Vermont Department of Employment and Training (DET) and IDX. While many of the workers had recently been displaced from IBM, some were new to the IT field and all were new to the healthcare field. To date, 300 individuals have applied to the program and six sessions have been held. **Thirty nine (39) students were enrolled and thirty eight (38) graduated and subsequently became employed by IDX – earning between \$40,000 – 50,000**, with full benefits after completing the one-year paid apprenticeship. Many of these individuals had formerly been turned away from the Human Resources Department due to a lack of health care experience on their resume.

Vermont HITEC, along with the Department of Employment and Training Apprenticeship Division screened applicants for background and aptitude and sponsored the eight weeks of intense and concentrated education. The graduates were then employed by IDX for one year as apprentices – as software engineers and software analysts – followed by full employment in these positions. The apprentices engaged in real IDX work, both in teams and individually.

The program's high success rate is due to the quality of both the education as well as the mentoring that these apprentices received on-the-job. Not only did the program help to alleviate an immediate hiring challenge, it also provided managers with employees who performed on par with current personnel in an accelerated time-frame. The Vermont ITAR program can be tailored to meet the workforce development needs of any company engaged in information technology.

Contois Music and Technology

Essex Junction, Vermont

In 1971 Dave, Dan, Stan, and Judy Contois opened Contois Pianos & Organs in Essex Junction, VT. The business developed a good local and regional customer base. About ten years later after Dave finished attending Boston's Berklee College of Music, he acquired the Yamaha Music Product franchise.

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Early users of the internet, in 1986 Dave developed the area's first Bulletin Board System (BBS) to provide customers with information via personal computers. Then, in 1986 the company, now called Contois Music and Technology launched an informational database website at www.contois.com, doing all the website development in-house. Building on the success of this initial effort, in 1997 Contois designed and launched the first e-commerce site for ordering Yamaha Portable Keyboards. **By 1999 business had grown and the company attracted national recognition as the featured cover story for Musical Merchandise Review magazine** for its unique business of selling Yamaha Music Products exclusively and extensively using the Internet.

Then, in September of 2001 Contois formed Contois Music & Technology, LLC, and a new and expanded e-commerce site www.eMusicGear.com was launched. By October of 2003 the eMusicGear site was redesigned and launched. Throughout this period the firm set up its own servers, designed and implemented its own websites, populated web servers to direct business to their site, and was a pioneer in point-and-click on-line retailing, and pay-per-click advertising. The firm uses IT for billing, e-mail, inventory control, and ordering. They plan to expand into

distance learning and community portals in the future. All these tasks require that employees master a wide range of IT skills and have the ability to adapt new technologies and learn new skills on a continuing basis.

Contois is now the nation's number two e-commerce retailer of Yamaha electronic music products with over \$2 million in sales. The number one e-commerce retailer is a 110 store chain with locations across the US. Employment has doubled to 10 individuals and they attribute the increase to the e-commerce activities. Contois began with a BBS system and then moved to AOL, downloaded Microsoft Demo software, studied case histories on Dell and Amazon and replicated their models. Training and development continues to be primarily an in-house function, and future growth will depend on more advanced skills and continued training.

Part IV
The Digital Divide

Women in IT – A Question of Equity

Local, state, and national figures demonstrate a large and growing gender digital divide in Information Technology. A report issued by the Information Technology Association of America (ITAA) in May 2003 finds that "...women made few inroads into high tech employment between 1996 and 2002 based on an analysis of data from the U.S. Bureau of Labor Statistics' (BLS) Current Population Surveys." The percentage of women in the overall IT workforce fell from 41% to 34.9% between 1996-2002. The ITAA report also finds that women earned only 22% of computer science and engineering undergraduate degrees in 2002. The report lists a number of barriers to entry that contribute to this situation such as:

- lack of women role models and mentors in IT careers
- an information gap about the academic requirements for IT careers
- the image of IT as a "masculine" profession
- stereotypes that may impede hiring and advancement opportunities⁵
- difficulties in recruiting, retaining, and promoting women in IT jobs

Overcoming these barriers can make a significant difference in earning power. In Vermont, the annual wages for computer related jobs are a minimum of 25% higher than the average annual state wage of \$28,920.

⁵ The 1998 Bayer Facts of Science Education Report IV found that 45% of female scientists believed girls were encouraged less than boys in science at the high school level and 39% believed the same applied in elementary school.

Nevertheless, the IT gender gap is evident in Vermont's secondary schools, hampering our ability to develop the IT workers for the future. The Vermont Institutes reports that among college-bound seniors in 2002, females made up only 10% of the students intending to major in Computer or Information Science in college⁶ The situation is similar in the State Regional Technical Centers. Despite significant efforts to increase the

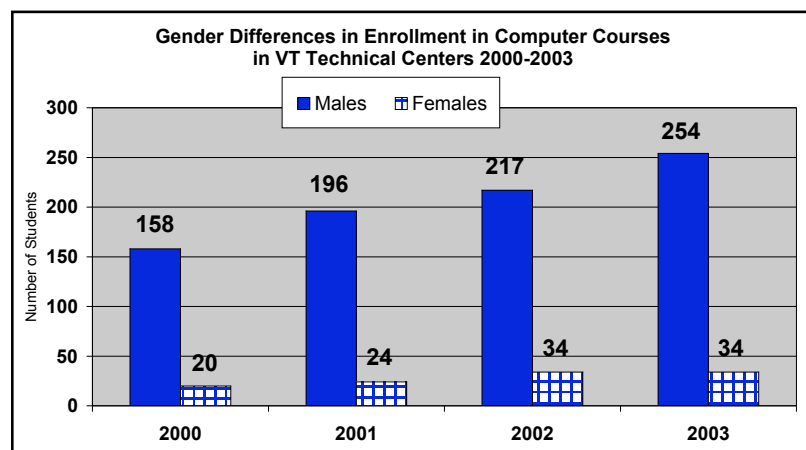
participation of young women, enrollment in computer courses at the Centers was just 12% in 2003, an increase of only 1% since 2000. The Vermont Institutes points out that addressing this gender imbalance becomes critical when we consider that nine out of ten of the fastest growing occupations requiring Bachelor's degrees are in information technology⁷. In response to this challenge, academic and industry partners are developing promising practices that ensure that girls

and women can participate fully in technology careers. For example:

- **The Vermont Institutes** offers technical assistance and training to schools for developing strategies to bridge the gender gap in IT.
- **The Vermont Department of Education** is supporting a pilot project to implement best practices for infusing gender equity principles in the development of IT literacy in our schools.

⁶ The College Board 2002

⁷ U.S. Department of Labor Bureau of Labor Statistics Bulletin 2540



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- **Northern New England Trades Women's Tech Savvy Girls™** creates a supportive continuum of opportunities for girls and women to become active in IT training and academic opportunities.

The Vermont Information Technology Center and the Vermont Commission on Women have formed a consortium and recommend specific strategies to attract Vermont women and girls to the information technology field. The consortium published a report and presented its findings at a half-day *Women in IT* conference in June 2004. The report presents an inventory of activities currently addressing the IT gender issue in Vermont, identifies best practices in Vermont and/or nationally, and recommends specific steps to bridge the gender digital divide in the development of the IT workforce.

Special Populations - New Opportunities:

Goal 3 of this report states that “Individuals will be well informed about employment opportunities that require IT skills and will have lifelong access to the necessary education and training services.” As workers experience the accelerating pace of technology in the workplace, IT skills become essential to achieving and maintaining economic self-sufficiency. Many employers make investments in IT worker training. Seventy-five percent of all funds expended on workforce education nationally come from employers upgrading the skills of their workers, particularly those at higher levels.⁸ This is a very significant investment that benefits both the worker and the employer. However, individuals not currently employed, or who do not receive such training as part of their employment are limited to their personal resources and to State and Federal programs, many of which have seen their funding

substantially reduced in recent years. As technology continues to be integrated into an increasing number of jobs, the employment opportunities available to those who lack these essential skills will continue to decline.

In 2003, Vermont had:⁹

- 61,000 families that were receiving public assistance or who were economically disadvantaged.
- 57,181 Vermonters who have disabilities that present special challenges in using technology.
- 54,986 who lack the essential basic skills demonstrated by a high school diploma.
- 34,075 who are refugees or immigrants and lack English language proficiency.
- 82,000 adults who lack basic literacy and numeracy skills¹⁰

The barriers to employment that many of these individuals face are well documented. At the same time, technology presents unprecedented opportunities for many of these individuals to participate successfully in the workplace and to be empowered in ways that were unimaginable only a few years ago. For example, technology can create work-at-home opportunities that overcome barriers such as physical and mental disabilities, single parenting, excessive commuting distances, and lack of adequate transportation. New assistive technologies can allow individuals who were previously unable to contribute in the workplace to become effective and productive workers. In addition, specially designed instructional software

⁸ Center for Labor market Studies, Northeastern University

⁹ 2000 US Census data for Vermont <http://factfinder.census.gov>

¹⁰ US Department of Education, National Adult Literacy Study

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can both accelerate learning and stretch the limited resources of adult education providers.

Education and training programs that recognize that all students can achieve, and that can provide the time and individual support necessary for them to do so will be most successful at serving these individuals. Infusing literacy training into job skills training for those who lack basic academic skills, or who face the challenge of English as a second language can assist them in acquiring the skills needed to become proficient in the work place.

Policies that focus on building IT skills and gradually phasing out public assistance as individuals succeed in the workplace can help many individuals overcome the fear of attempting to live on a part-time or a sub-

standard starting wage. For example, recent changes in Social Security law provide enhanced opportunities for individuals with disabilities to earn wages without penalties. Overcoming individual barriers and removing obstacles will require a creative approach using innovative delivery models that can build on individual strengths and accommodate individual needs. Providing sufficient time and support to individuals willing to acquire the skills for employment will require changes in some agency and training provider policies. The long term gain will be an enhanced quality of life for individuals, workers who can contribute to the success of their employers, reduced costs for State programs and a well trained workforce sustaining Vermont's economic growth.

Work at Home Occupations:

One solution for Vermont's unemployment and skills gap challenge:

As part of a study of the potential for increasing the number of work-at-home jobs the Vermont Telecom Advancement Center (VTAC) undertook a research project to evaluate the potential of training

unemployed individuals and persons with disabilities to work at home. Training was provided over the winter of 2003/2004 to individuals interested in working from their homes for large companies, such as Putnam Investments or the Immigration and Naturalization Service; both of whom have many fulltime employees working from their residences in Vermont. The training was also appropriate for those who were considering starting their own business from home.

The training, funded by a grant from the U.S. Department of Labor, had three components; 1) Improving soft skills, 2) planning or organizing a home business, and 3) acquiring basic computer skills in Word, Excel, and the Windows Operating System. The grant supported the development of the program and the delivery of two pilot courses; one in Springfield (9 completers) and one in Newport (10 completers). Northeast Kingdom Community Action provided training in Newport, and Vermont Panurgy provided the training in Springfield. The Burlington office of ORC-Macro provided evaluation of the program. Copies of their report are available from the address below.

The program provided a good indication of the interest of Vermonters in work-at-home technology-based employment. Applications far exceeded the available seats. Of those enrolled, most students indicated a preference for working as an employee, although several were interested in starting their own home-based businesses or working as independent self-employed contractors. About half the students had minimal computer skills upon entry into the program. In addition to computer skills, the students were provided with related workplace skills such as resume development and business plan development. At the beginning of the course, students rated "soft" workplace skills such as Problem Solving, Goal Setting, or Interpersonal Skills as less important, however, upon completion most students rated instruction in this area as one of the most valuable parts of the course.

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Overall students were very satisfied with the program, and reported significant gains in both applied computer skills and workplace skills. Most also reported that they needed further training in the areas of software installation, keyboarding, and trouble shooting. Follow-up on employment outcomes were not part of the project design, however it is clear that given the opportunity many Vermonters would take advantage of such training if it were available in their region, and that substantial skill gains can be achieved in a relatively short program.

Greg Epler-Wood served as Project Manager on behalf of VTAC. Should you desire additional information, please contact him at 802-861-7364 (E mail: mediavox@sover.net)

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